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HIGHLIGHTS '67



Canada

DEPARTMENT OF ENERGY, MINES AND RESOURCES



DEPARTMENT OF ENERGY, MINES AND RESOURCES

HIGHLIGHTS '67

In Centennial Year when Canadians were proudly taking stock of their country and its achievements, it was particularly appropriate that the resources arm of the federal government — the new Department of Energy, Mines and Resources — should have recorded marked progress in promoting the economic development and preservation of Canada's natural resources.

The importance of the task is better realized against the background of the tremendous pressures which today's fast-moving industrial society is exerting on resource supplies. It is further underlined by the serious problem of the increasing pollution of our most vital resources — fresh water and air.

Topping the Department's agenda was the inauguration of a major program of research on abatement and control of water pollution. Scientists, engineers, resource planners and economists, working with other federal departments, various levels of government and with research agencies and industry, launched an attack on the many aspects of the problem.

Vitally important also were projects in the realm of the mining and metallurgical sciences aimed at assisting the Canadian mineral industry, which in 1967 achieved a total production valued at \$4,400,000,000.

The Department examined exciting possibilities for the development and use of Canada's massive energy potential — oil, gas, coal, uranium and electrical energy. Projects under way include a \$5,000,000 water-resources study of the Saskatchewan-Nelson River basin and the first phase of the cooperative development of the hydro resources of the Nelson River, in which the federal government has agreed to spend \$170,000,000 to build the world's highest voltage transmission system to bring the power to market.

In one of its greatest field programs, the Department placed 1,500 geodesists, engineers, geologists, geophysicists, hydrographers and oceanographers in the field in every nook and corner of Canada to continue with the basic mapping of the country, the assessment of its resource potential and the study of the physical characteristics of its vast land and water masses.



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MAPPING

Basic Mapping

The basic requirement for resource development is the production of suitable topographic maps of the country's vast land areas. Highlight of the year was the completion, by the Surveys and Mapping Branch, of the topographical mapping of Canada at the medium scale of 1:250,000, or about four miles to the inch. The Branch pressed on with the larger scale mapping at 1:50,000 in the more settled areas and areas of greater economic importance. About 35 per cent of this task has been completed.

In its largest topographical project, it used the aerodist system (an electronic method for measuring distance from an airplane) to extend highly accurate control (latitude and longitude) for mapping over a large area of northwestern Ontario and the inter-lake region of northern Manitoba. It established survey control for 1:50,000 mapping over 125,000 square miles and first-order control stations at 70-mile intervals over 95,000 square miles of the region.

Branch geodesists extended the framework of survey control in the Far North across Robeson Channel from Ellesmere Island to Greenland. They will repeat the operation in another 10 years to determine whether these two land masses are moving apart.

Maps, Air Charts, Air Photos

Meanwhile the demand for survey information reached an all-time high. In 1967 the Branch sold over 4,500,000 copies of maps, charts and air photos valued at more than \$1,000,000. Distribution of air traffic navigation aids increased by 20 per cent. The number of enroute charts, which are distributed to airlines around the world, rose to 1,500,000 copies, and of instrument approach procedure

charts, for inclusion in the Canada Air Pilot and the Military Pilot Handbook, to 10,000,000 copies. Continuing its interest in air safety over Canada, the Branch developed and produced a new series of 22 air traffic controller charts to assist the air traffic controller and to reduce conversation between the latter and the pilot.

Among the new maps printed, the most popular were a road map of Canada in English and French and an historical map, depicting the territorial evolution of Canada. A nostalgic touch: the withdrawal from distribution of the old three-mile map of the Canadian Prairies, first printed in 1891 — the map which opened up the Canadian West.





GEOLOGY AND GEOPHYSICS

The program of the Geological Survey of Canada continues to uncover fresh clues to Canada's mineral potentialities and new scientific knowledge contributing directly to the development of resources and industry. In 1967 the Survey placed 99 parties in the field to carry out a \$3,000,000 program of mapping and study of Canada's geology in all the provinces and in the territories up to the tip of Ellesmere Island.

Supporting the parties were 10 helicopters and seven fixed-wing aircraft under full-time contract. But, from time to time, the Survey used many other aircraft, both rotary and fixed-wing, on a casual charter basis.

Hudson Bay Lowlands

In northern Ontario, a 20-man party, using two helicopters, a fixed-wing aircraft and rubber boats — most of the area is impassable on foot during the summer because of the muskeg — carried out a geological reconnaissance survey over a 130,000-square-mile area of the Hudson Bay Lowlands bordering the southwest side of Hudson and James bays. The region is underlain largely by rocks of an age and type known to be productive of oil and gas in southwestern Ontario and elsewhere in Canada. These formations extend beneath the waters of Hudson Bay where geophysical surveys indicate a considerable increase in thickness, which enhances their economic potential for petroleum. A number of oil companies are actively exploring the northern lowlands for oil and gas. The first results of the 1967 field operation, including a geological map and a preliminary report describing the various rock types, have been published.

Coast Mountains

A 10-man party, using two helicopters and a barge, continued the mapping of the 44,000-square-mile area of the Coast Mountains in British Columbia between the 49th parallel and Portland Canal, one of the most rugged and inaccessible parts of the Cordillera. At the start of the project in 1962, the region was one of the largest in North America not covered by geological maps. The mountains are laced by many fiords, but working inland from these tidewater routes by conventional methods proved prohibitively slow and inefficient. In 1967 the party worked in two sections: one on the east side of the mountains, using a helicopter, and the other, on the west side, using a barge and a helicopter. Operating from the barge, the geologists had a lift of 10,000 feet to the unmapped mountain areas. They also used small rubber boats with outboard motors to examine the shore line. The work is scheduled for completion in 1970.

Quebec and Labrador

In northeastern Quebec and the adjoining area of Labrador, a 15-man party coped with rugged terrain and bad weather in carrying out the first phase of a two-year reconnaissance mapping project over a potential mineral-bearing area of 38,000 square miles. The party used two helicopters and a fixed-wing aircraft.

Aeromagnetic Surveys

Cooperative federal-provincial aeromagnetic surveys were flown over 70,000 square miles in the territories, British Columbia, Saskatchewan, Manitoba, Ontario and Quebec. The basic data provided by these surveys assist the various governments in their geological investigations and are used by industry as guides for prospecting. Over 934,000 square miles of territory have been covered by these surveys since 1962. The project is scheduled for completion in 1974.

The Search for Uranium

The Geological Survey continued its major research program designed to promote interest in the exploration for new deposits of uranium in Canada. Estimates of the uranium needed for the generation of power in the Western World indicate that, by 1975, even Canada's large resources will be inadequate to meet the demand. Atomic power plants can be justified only when adequate supplies of uranium at prices competitive with other fuels can be guaranteed for at least 25 years. In 1967, the Survey examined and studied the classical uranium areas in Canada and the new areas which have come to light in the past few years. It also examined deposits in the United States, thus enhancing its potential for defining regions and rock formations favorable for uranium prospecting in Canada and made progress in the development of a promising geochemical method of prospecting for uranium.

Remote-Sensing Devices

Hoping to take advantage of a breakthrough in airborne geophysics and remote sensing, which has stemmed from recent military and space technology, the Survey prepared to investigate various types of sensors that may be used in resource surveys by satellite. It will cooperate with several other government agencies in a series of test surveys to determine what sensing devices would be most useful in a satellite. Such surveys may well be of tremendous importance in developing countries like Canada, possessing large areas potentially rich in natural resources of all kinds.

The New Calgary Institute

In September the Geological Survey opened its Calgary-based Institute of Sedimentary and Petroleum Geology. The new Institute will provide scientific information to industry, the universities and other government agencies and carry out research programs on the sedimentary basins of Western and Arctic Canada.



MINING, METALLURGY AND FUELS

The value of research and the need for technological innovation in the mining industry became more apparent in 1967 with the tightening of the industry's competitive position at home and abroad. Canada's increasing dependence on complex low-grade ores, the need for the development of more economic methods of mining, extraction and refining of minerals, and the demand for more refined mineral products led the Mines Branch to place increasing emphasis in its research programs on the role of mathematics and certain sciences, including the biological science, which has not been associated with extraction of non-renewable resources.

Bacterial Leaching

One of the more fascinating new prospects is the extraction of uranium minerals by bacterial leaching with possible application to the processing of other ores. In 1967 Branch scientists worked on the application of the process in salvaging uranium from mine wastes and concentration rejects. They also sought to determine its advantages over the hot acid leaching process now used by uranium mines. Indications are that the time required for economic extraction by bacterial leaching could result in a substantial saving in costs.

Mining Research

To streamline its mining research, the Branch has formed a computer group of mathematicians, physicists and engineers capable of simulating the technical and economic aspects of many mining operations. Research is conducted on ground control, rock breakage and mining environment to increase the safety of operations, decrease costs and avoid the waste of limited resources. The Branch is using fully the advantages offered by its major centre of mining research located in an operating mine at Elliot Lake in northern Ontario.

Sulphide Minerals

Meanwhile, Branch physicists, mineralogists, chemists and spectrochemists continued their study of the characteristics and chemical composition of sulphide minerals — the source of the base metals which account for the great bulk of Canada's mineral production. These scientists are gaining new insights into the physical properties of these minerals and their occurrence in ore deposits.

Construction Materials

The growth of the construction materials industry has brought about the development of stricter specifications for the quality control of building products. The Mines Branch conducts numerous studies aimed at improving methods of evaluation and production of construction materials to meet the exacting needs of industry. In a major contribution in 1967, it advanced and refined its ring test method for measuring the tensile properties of concrete, a method which will assist greatly in the solution of the problems involved in the preparation of concrete.

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Filtration

Branch engineers made significant progress in their research on the fundamental principles of filtration, an important operation in the extraction of valuable metals and minerals from their ores. A new concept was brought to light which will ultimately lead to a more efficient filtration system and the reduction of the effluents from mineral process plants.

Steel Castings

The Branch continued its investigation of the steel-casting process in an effort to improve the quality of steel castings produced commercially. It is using radioactive tracer techniques and the electron probe to study the structure of steel and the segregation of alloying elements, which can have a marked effect on the mechanical properties of the castings.

Air Pollution Research

The rise of air pollution resulting from industrial activity and population concentration has led the Branch to accelerate research into this problem through its Canadian Combustion Research Laboratory. Efforts are directed at reducing pollution at combustion sources before pollutants are discharged into the atmosphere with their resulting damage. A widespread problem in Canada has been the emission of acid soot from heating, process and industrial boilers burning high-sulphur fuels, particularly residual oil and coal. Another contribution to air pollution control was the development of a proposed standard to control particulate matter emitted from chimneys. The soon-to-be published, proposed standard provides, in convenient graphical form, a means for setting chimney height and efficiency of dust-collecting apparatus so as not to exceed a tolerable amount of dust in the air at ground level.





ASTRONOMY AND GEOPHYSICS

The Observatories Branch carries out research in stellar and earth physics. Its interests range from the earth's centre to the reaches of outer space.

Accurate Time

Its most popular public service is the noonday signal broadcast by the CBC and the continuous signal over the three short-wave channels of CHU together with a bilingual voice announcement each minute of the day. Twin atomic clocks, transported by air from one national time centre to another twice during 1967, were used to compare Ottawa atomic time, on a world basis, to one ten-millionth of a second.

Meteors

The meteor observatories at Meanook and Newbrook in Alberta yielded numerous pictures of meteors, together with their spectra, in a continuing study of the upper atmosphere of the earth, the composition of meteors and the paths they follow when approaching the earth. Plans were made for the development of meteorite observation and their recovery while still fresh.

Radio Astronomy

The Dominion Radio Astrophysical Observatory in Penticton, B.C., in 1967 joined with the universities of Toronto and Queen's and with the Algonquin Radio Observatory of National Research Council to effectively make one radio telescope extending 2,000 miles to Algonquin Park in Ontario. The experiment yielded valuable knowledge on the physical characteristics of certain radio sources.

Seismology

Observatory seismologists obtained new information on the deep structure of the earth from their array of 19 seismic instruments in vaults near Yellowknife in the Northwest Territories. The array, which is laid out in the form

of an asymmetric cross, has the second largest aperture of any seismic array in operation in the world. Built cooperatively with the United Kingdom Atomic Energy Authority, the project is part of a continuing research study of the problems involved in the detection, location and identification of underground nuclear explosions. Canada has been active in attempting to form a nuclear detection club among the non-nuclear nations of the world.

Earthquakes

There is an increasing demand for estimates of earthquake risk, particularly for construction engineering purposes, including such critical structures as nuclear reactors. Seismologists have determined the locations, sizes and characteristics of all Canadian earthquakes to the end of 1964. They have studied many hundreds of earthquakes in eastern Canada alone, and many more along the West Coast. They have devised new procedures for estimating earthquake risk for engineering purposes and are compiling, by computer, a new earthquake zoning map.

Gravity

Observatory geophysicists completed the compilation of the new gravity map of Canada. The map has been published in four sections at a scale of 40 miles to the inch.

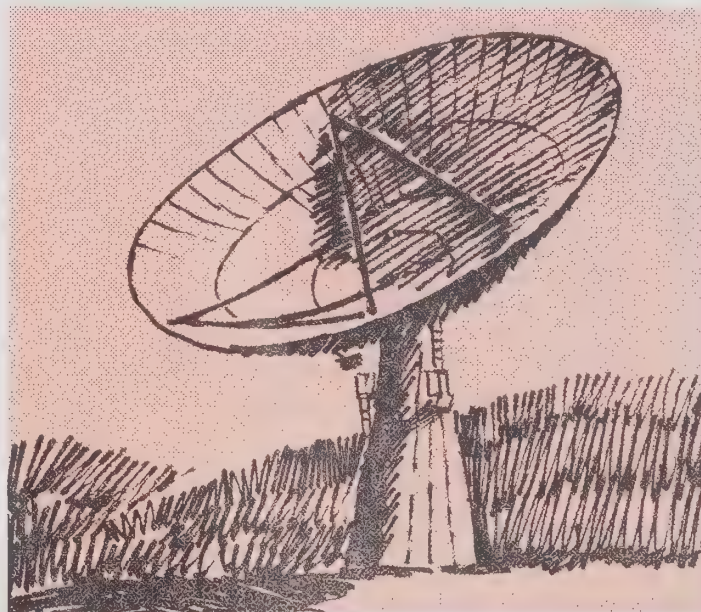
Locating the North Pole

In conjunction with the Polar Continental Shelf Project, the Observatory sent a team of scientists to measure gravity at the North Pole. They determined the exact location of the Pole by repeated observations of the sun, certain stars and planets, and artificial satellites. They dropped a sonar device to the floor of the Arctic Ocean to serve as a fixed point and to provide a marker for future geodetic, geophysical and bathymetric work.

Magnetic Charts

Information about the earth's magnetism is important to prospecting, navigation, telecommunications and a host of endeavors, both scientific and technological. In 1967 the Observatory continued to operate its network of nine magnetic observatories in Canada. These stations are part of a world-wide network of some 150 to 200 observatories, each of which produces continuous photographic recordings of the natural time variations in the geomagnetic field.

The Observatory compiles and publishes magnetic charts at regular intervals on a scale of 100 miles to the inch. It obtains the necessary data from field and high-level surveys (10,000 feet) with the three-component magnetometer, which it designed and developed a few years ago. An airborne magnetic survey over the Province of British Columbia and a 200-mile-wide strip along the Pacific coast is planned for 1968.



THE POLAR CONTINENTAL SHELF PROJECT

Eighty engineers and scientists of various disciplines carried out 25 investigations in the High Arctic between March and October under the Polar Continental Shelf Project, a special continuing study of the shelf underlying the Canadian portion of the Arctic Ocean and the Arctic Islands. Main base of operation in 1967 was Mould Bay on Prince Patrick Island, with a second base at Alert on northern Ellesmere Island. Hydrographic, gravity and aeromagnetic surveys were carried out over the continental shelf and the Arctic Ocean offshore from Prince Patrick Island. A seis-

mic survey was run 300 miles out to sea to investigate the structure of the earth's crust under the continental shelf and slope. Other investigations from Mould Bay included the measurement of geothermal heat from the ocean floor, the study of sea bottom sediments in the vicinity of Melville Island and of ice caps on Melville and Meighen islands. Hydrographic, gravity and oceanographic surveys were run from Alert over the Lincoln Sea. Provision of field support, a major function of the Project, was extended to other federal departments and the universities in a number of programs.



WATER-BASED PROGRAMS

A significant factor that brought about the formation of the new Department of Energy, Mines and Resources was the pressing problem of pollution and the need for a national water policy. Marked progress was made during the year in the organization of the Department's Water Group. An Assistant Deputy Minister was appointed, the Inland Waters Branch was established in April, and the Policy and Planning Branch in May. The existing Marine Sciences Branch was included in the Group.

INLAND WATERS

Studies on pollution, its source and its abatement, will be the most crucial research for some time to come. Because pollution of the Great Lakes, particularly Lakes Erie and Ontario, is so critical, the Inland Waters Branch plans to build a new research centre, the Canada Centre for Inland Waters, at Burlington, Ontario. In the meantime, it has moved 50 trailer laboratories to the site to tackle the problem without delay. Three launches of the Canadian Hydrographic Service and two chartered ships operated on Lakes Erie and Ontario from the Burlington centre in 1967, carrying out pollution investigations and studies.

The Canada Water Act

Work proceeded on the drafting of a Canada Water Act, intended to provide new institutions for the coordination of policy and programs within the federal government, more flexible arrangements for entering into agreement with the provinces on water programs, expanded research and the establishment of water quality objectives and standards. Important aims are the early joint preparation, in cooperation with the provinces, of comprehensive basin or regional framework plans for water development — at least for the major basins.





Water Inventory of Canada

The Department obtained considerable information on the availability, quality and physical behavior of Canadian waters for addition to its Water Inventory of Canada. It added some 300 stations to the national network bringing the total number to 3,000. There are five different types of stations: streamflow and water levels, tide and navigation, sediment transport, water quality and groundwater. Information on river flows, lake levels and water quality is used to study, in a preliminary way, the availability and suitability of water for domestic, municipal, industrial, irrigation, water power, fisheries, recreation and other uses. Water level data on oceans, lakes and canals are necessary for navigation and charting purposes.

Saskatchewan-Nelson Basin Board

The Canadian Government and the three Prairie Provinces set up the Saskatchewan-Nelson Basin Board to do a major \$5,000,000 study of the water resources of the Saskatchewan-Nelson River basin. The new Board will study the feasibility and cost of many combinations of storage and diversion structures needed to provide a firm water supply at various selected points along the river system.

Flood Abatement, Lower Fraser River Valley

Negotiations proceeded toward an agreement to undertake a major federal-provincial program for flood abatement in the Lower Fraser River Valley, an agricultural and industrial area of great importance to the economy of British Columbia. A committee was established in 1966 to study the 1963 federal-provincial proposals recommending a major upstream storage reservoir, diversions projects and substantial improvements to existing dykes to prevent further flooding. The new committee has extended the dyking improvement proposals to include sea dykes, improved drainage and pumping capacity and protection against erosion, at an estimated cost of \$33,000,000.

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The Canada Water Conservation Assistance Act

The Department studied the engineering and economic feasibility of projects proposed by the provinces under the Canada Water Conservation Assistance Act. More than \$38,000,000 of the \$53,523,000 of federal funds committed to major flood control and water conservation projects had been expended by the end of 1966-67 and another \$9,900,000 committed for 1967-68. Six agreements are in force: three with the Province of Ontario and three with British Columbia. In two additional agreements, not under the Act, with Manitoba, construction of dykes around three communities on the Red River was well advanced in 1967; the Red River Floodway will be completed in 1968.

Groundwater Studies

Ten new groundwater projects were started in 1967 to assist in meeting the marked increase in demand in Canada for information on groundwater resources. These projects range from two basin studies in British Columbia to gain information on the behavior of water in its natural regimen to a study in New Brunswick of the mine pollution problem in the Miramichi River. They include the establishment of observation-well networks in northern Ontario and Quebec and on Prince Edward Island to determine the natural changes in groundwater levels resulting from man's use and a study of the wet lands in northern Ontario for forestry purposes.

Stream Pollution from Mining Operations

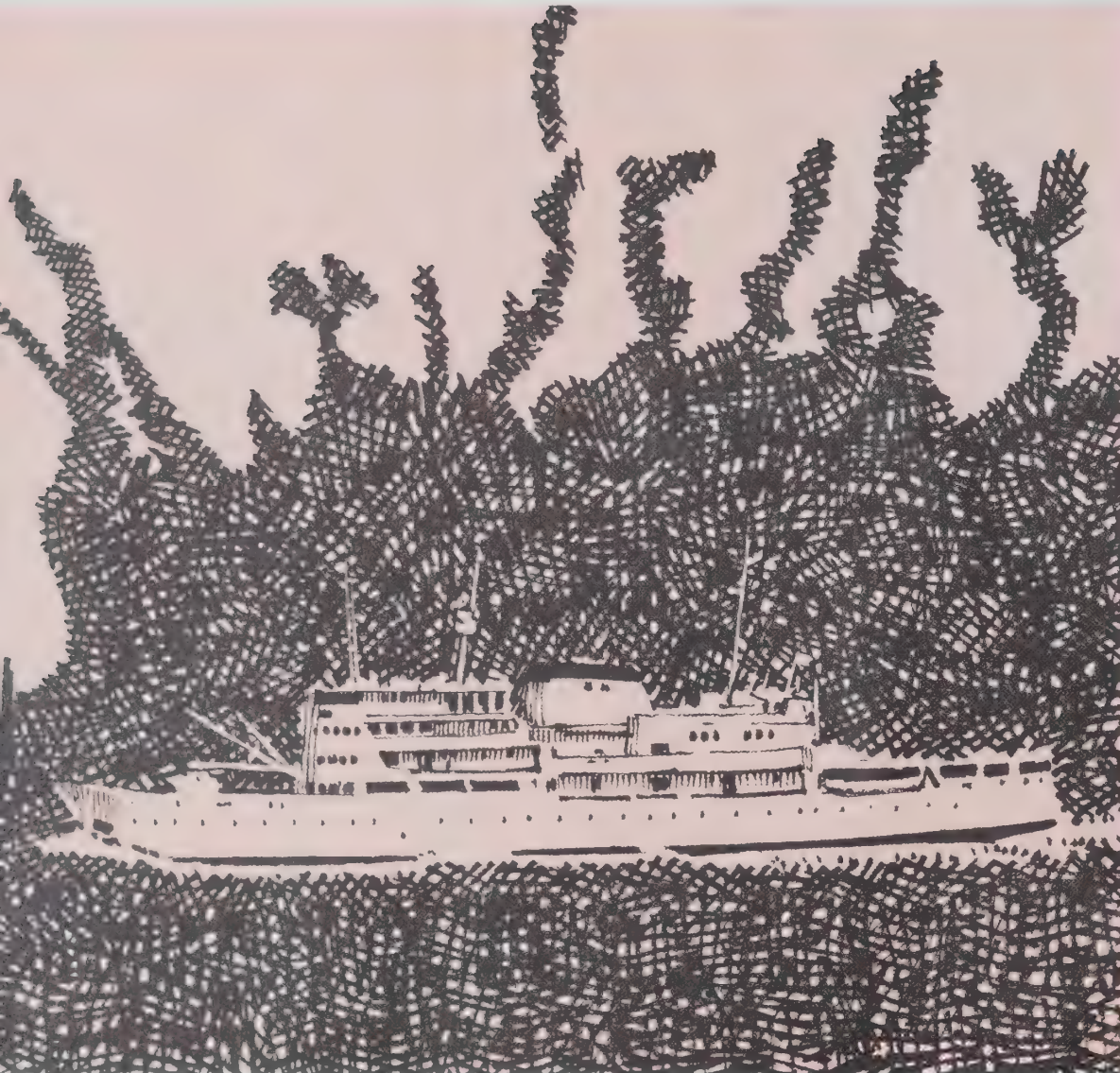
Scientists commenced a basic study into the transport of materials from mining operations by the receiving streams in New Brunswick. Daily samples are taken and these are analyzed at the Department's eastern laboratory at Moncton which was established in 1966. In Ottawa the Department is assembling equipment to study these samples in depth. The work is being done for the Department of Fisheries to ascertain whether base-metal mining operations are having adverse effects on Atlantic salmon migrating up New Brunswick rivers.

Assistance to IJC

The Department continued to provide major technical and engineering support for studies of the International Joint Commission on Great Lakes levels, pollution and the proposed international Pembina River program, a study of dams and reservoirs to provide a water supply for irrigation and other purposes in the Pembina River Valley in North Dakota and in Manitoba.

Proposals Resulting from Pollution Conference

As a result of the *Pollution and Our Environment Conference* held in Montreal in November 1966, the Minister made several proposals to the provinces at the meeting of the Canadian Council of Resource Ministers in May 1967. These included the establishment of regional centres for research on water pollution problems and of a National Advisory Committee on Water Pollution as well as endorsement by CCRM of the establishment of a federal-provincial task force to study and advise on national and regional objectives for water quality.



CHARTING

The Canadian Hydrographic Service of the Marine Sciences Branch charted some 40,000 square miles of Canada's navigable waters, of which 34,000 square miles were on the Atlantic coast, mainly on the Grand Banks. In the eastern Arctic, it carried out reconnaissance surveys over 4,000 square miles of coast off eastern Baffin Island. Inland, it charted 1,200 square miles, including parts of Lake of the Woods, Georgian Bay, the Trent-Severn Waterway and the Upper Ottawa River.

Nautical Charts

Forty new charts were published. Two of the Arctic Ocean Basin are the most comprehensive bathymetric charts ever produced of the Western Hemisphere portion of the Arctic. They show ocean depths and the topography of the ocean bottom for the whole hemisphere north of the 72nd parallel. Already they have aroused the interest of the scientific community, geophysical societies and several oil companies which have written to the Department commenting favorably upon them. The charts will facilitate initial exploration for oil and mineral wealth in the Arctic Shelf and are in demand particularly by industry interested in the potential oil-bearing basin in the Queen Elizabeth Island region.

The demand for nautical charts jumped 30 per cent over 1966 to 290,000. Much of the increase was due to the large number of visitors to EXPO '67 who made the journey by pleasure boat. To encourage this, over 100,000 copies of the Information Bulletin, *Cruising to Expo '67*, were issued mostly in the United States.

COASTAL WATERS

Through its Bedford Institute of Oceanography at Dartmouth, N.S., the Marine Sciences Branch continued its study of the structure and composition of the continental shelf to ascertain its potential resources. The results obtained by its marine geologists, geophysicists and hydrographers have attracted the attention of the petroleum industry, particularly to areas off the coasts of Nova Scotia and Newfoundland.

The Atlantic Shelf

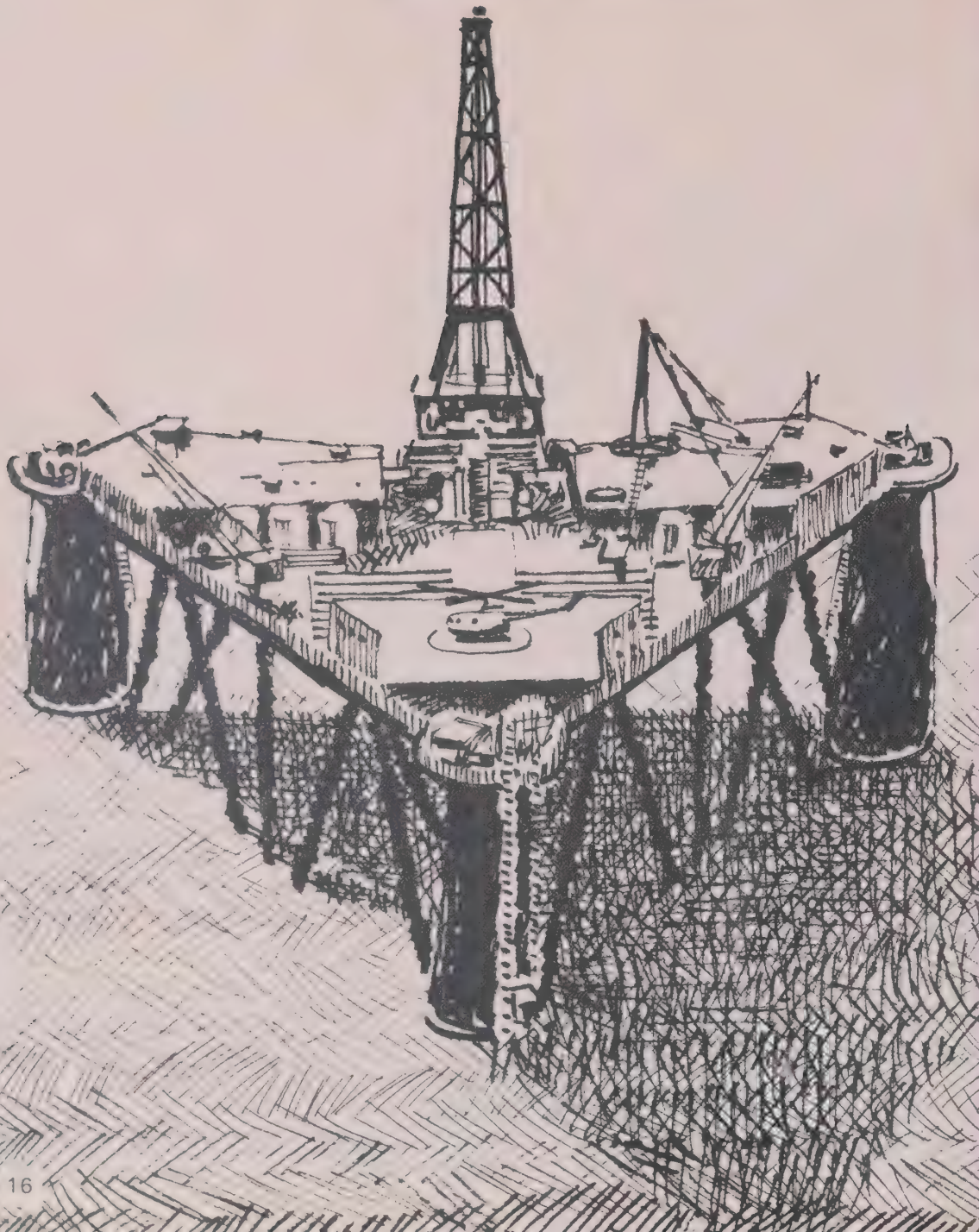
Hydrographers and geophysicists in 1967 carried out their most intensive survey yet off the Grand Banks east of Newfoundland. Hydrographers accurately positioned Virgin Rocks, the most shallow spot on the Banks, and made the first detailed survey of Flemish Cap, the eastern extremity of the Canadian shelf. Geophysicists took gravity measurements and observed the intensity of the earth's magnetic field to gain knowledge of the structure of the shelf in that region. The hydrographic information obtained will be shown on a new series of detailed bathymetric charts of the region, for use in navigation, fisheries and exploration for oil and mineral wealth.

Study of Bay of Fundy Tides

In their studies of the tides of the Bay of Fundy, BIO scientists have made two discoveries important to the possible harnessing of the tides there. They have found, first, that man-made structures have little effect on the overall tidal motion of the Bay and, secondly, that the large tidal ranges observed in the Bay are due primarily to the large amplitudes of the tide fed into the Bay at the mouth.

Mixing of Ocean Waters

BIO oceanographers carried out a winter study of Denmark Strait to further their knowledge of the distribution and types of cold and mixed oceanic waters lying off the Canadian coast. They measured the volume of the Norwegian Sea overflow into the Atlantic Ocean, the sinking of the water off east Greenland and its spread throughout the Labrador Sea. Scientists from the United Kingdom and the United States joined the expedition which featured the use of some of the most advanced oceanographic instrumentation in the world today. It was developed by Germany, the United Kingdom and United States.



Extension of Gold Mining Assistance

Financial assistance to marginal gold mines to counteract the effects of increasing costs of production and a fixed price for gold was extended three years to the end of 1970 with the amendment in December of the Emergency Gold Mining Assistance Act. No change was made in the method of calculating the assistance payable to eligible gold-mine operators. Thirty-seven operating lode gold mines received assistance in 1967. Payments for the fiscal year 1967-68 are expected to amount to \$15,000,000, the same as in the previous year. The subvention assists communities to adjust gradually to diminishing gold production.

Offshore Exploration

The Department issued 382 permits for offshore exploration for oil and gas in 1967 bringing the total to 3,002 covering 222 million acres. Of these permits, 1,892 (151 million acres) were off the east coast, 285 (17 million acres) were off the west coast, and 825 (54 million acres) were in Hudson Bay. Revenues amounted to \$120,000 and, in December, the Department held \$12,600,000 in guaranty deposits. More than 300 claims for mineral rights, other than oil and gas, were issued off the east coast, the west coast and in Hudson Bay, and 100 oil and gas leases on federal lands within the provinces, bringing the total to 273. Revenue from the leases was \$350,000. The Supreme Court of Canada found, on November 7, 1967, that the ownership and jurisdiction over all submerged resources off the west coast lie with Canada and are thus the responsibility of the federal government.

GATT Negotiations

The Department was represented by a senior officer on the Canadian Tariffs and Trade Committee at the Kennedy Round of trade negotiations under the General Agreement on Tariffs and Trade (GATT), in which Canada received tariff concessions from other countries and gave concessions in return. The Department provided the necessary support services, and assisted in the evaluation of briefs from industry and in the study of intra-governmental proposals in the field of minerals, metals and related semi-fabricated products. It prepared assessments of mineral industry needs and problems and made recommendations on the mineral content of the Canadian offer.

Cape Breton Development Corporation

Legislation was prepared and introduced in the House of Commons in June 1967 to establish the Cape Breton Development Corporation. The Act received royal assent on July 7 and was proclaimed on October 1. The Corporation is charged with the rationalization of the coal-mining industry in the Sydney-Glace Bay area of Cape Breton Island and the encouragement and development of new industry on the Island. The program developed for Cape Breton Island, on which the Department did extensive work, marks the commencement of a new and interesting approach to the problems of a coal-mining industry.

Mineral Reports

Among the many reports published, there were three of special significance. *Mineral Resource Development, Province of New Brunswick*, which was prepared at the request of the Atlantic Development Board, reviews in depth the province's mineral industry, development and production and describes, in detail, operations of current producers. It contains an appraisal of the possible course of future mineral developments, including production, capital investment and employment trends, and the direction that assistance from the provincial and federal governments might take to speed up that development.

The Uranium Industry, Its History, Technology, and Prospects is a timely report on the Canadian and world uranium industry. It comes at a time when the Canadian uranium industry is preparing to meet the needs of an expanding commercial market for uranium in the field of nuclear power.

The Digest of the Mineral Laws of Canada is a summary of the Acts and Regulations in effect in Canada in 1965 and 1966 on the disposition of rights, conservation rules, fees, mineral taxation and royalties, and bounties and subsidies concerning minerals. This is the sixth edition of the Digest.



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Organization of the Energy Group began with the appointment of an Assistant Deputy Minister for Energy. The prime objective is to develop expertise in the fields of oil and gas, coal, uranium and electrical energy to permit a sound appraisal of proposed national policies in the total energy context.

Nelson River Power

The federal government agreed in July to spend \$170,000,000 to build the highest voltage, direct-current line in the world, a 600-mile power link to supply power from the Nelson River to southern Manitoba. The federal government is cooperating with the Province of Manitoba to develop the massive resources of the Nelson River, which exceed 5,000,000 kilowatts, to take advantage of the potential for Manitoba and adjoining provinces and of possible exports in the future. The federal role is to build, run and operate the transmission facilities. The entire federal expenditure, plus interest, will be recovered from revenue derived from the facilities. Earlier the federal government and the Province of Manitoba had investigated the hydroelectric potential of the Nelson River at a shared cost of \$4,300,000.

Columbia River Treaty

The first of three Canadian dams in the Columbia River Basin was placed in operation in July, more than two years in advance of the date required by the Columbia River Treaty. The Treaty calls for the construction and operation of the three dams in return for a half share of the added power generation and flood control resulting downstream in the United States. The Department is represented on continuing boards, or committees, charged with the responsibility of ensuring that all requirements of the Treaty are properly discharged.

Trans-Canada Transmission Network

Investigations by the federal provincial working committee on long distance electrical transmission were completed in 1967 and a report prepared for submission to appropriate ministers.

Atlantic Tidal Power Programming Board

Consultants were chosen to undertake scientific and engineering studies of the tidal power potential of the Bay of Fundy for the Atlantic Tidal Power Programming Board. The Board and its Engineering and Management Committee, which are both chaired by representatives of the Department, were established in 1966 to carry out a two-year, \$1,500,000 study of the physical and economic potential of the development of electric power from the tides of the Bay of Fundy and the transmission of that power to markets in Canada and the United States. The final report of the Board and its Committee is scheduled for 1968 and should indicate whether more detailed studies of specific sites are warranted. While the study is limited to wholly Canadian development possibilities, the tremendous amount of power involved suggests the possibility of significant power exports. The federal government and the governments of the provinces of Nova Scotia and New Brunswick signed an agreement in August 1966 calling for the study.

Copies of this brochure are available from
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